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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,725	11/13/2003	Lane Thomas Holloway	AUS920030181US1	2699

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EXAMINER

SAVLA, ARPAN P

ART UNIT	PAPER NUMBER
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2185

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/713,725

Applicant(s)

HOLLOWAY ET AL.

Examiner

Arpan P. Savla

Art Unit

2185

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-8, 10-13 and 15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10-13 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### **Response to Amendment**

This Office action is in response to Applicant's communication filed March 27, 2006 in response to the Office action dated December 23, 2005. Claims 2, 12, and 13 have been amended. Claims 4, 9, and 14 have been cancelled. Claims 1-3, 5-8, 10-13, and 15 are pending in this application.

## **OBJECTIONS**

### **Drawings**

1. In view of Applicant's amendment, the objections to the drawings have been withdrawn.

### **Specification**

2. In view of Applicant's amendment, the objections to the specification have been withdrawn.

### **Claims**

3. In view of Applicant's amendment, the objections to **claims 2 and 4** have been withdrawn.

**REJECTIONS NOT BASED ON PRIOR ART**

**Claim Rejections - 35 USC § 112**

4. In view of Applicant's amendment, the 112 first paragraph rejections to **claims 4, 9, and 14** have been withdrawn.

5. In view of Applicant's amendment, the 112 second paragraph rejections to **claims 12-14** have been withdrawn.

**REJECTIONS BASED ON PRIOR ART**

**Claim Rejections - 35 USC § 102**

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1, 3, and 6-7** are rejected under 35 U.S.C. 102(b) as being anticipated by Mendelson et al. (U.S. Patent Application Publication 2002/0095553).

8. **As per claim 1**, Mendelson discloses a cache system for a computer system, comprising:

a first cache for storing a first plurality of instructions (paragraph 0003, lines 9-12; paragraph 0028, lines 4-6; paragraph 0033, lines 2-3; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, element 320). *It should be noted that "filter trace cache (FTC)" is analogous to "first cache."*

a second cache for storing a second plurality of instructions (paragraph 0028, lines 4-6; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, element 330). *It should be noted "main trace cache (MTC)" is analogous to "second cache."*

wherein each instruction of the first plurality has an associated counter and wherein when a first instruction of the first plurality is accessed, a first associated counter is incremented (paragraph 0031, lines 10-13; Fig. 3, element 360).

and wherein when the first associated counter reaches a threshold, the first instruction of the first plurality is copied into the second cache (paragraph 0034, lines 15-16).

9. **As per claim 3**, Mendelson discloses the first instruction of the first plurality is accessed from the second cache (paragraph 0035, lines 15-16).

10. **As per claim 6**, Mendelson discloses a method of managing cache in a computer system, comprising the steps of:

checking for a first instruction in a first cache, wherein each instruction in the first cache has an associated counter (paragraph 0031, lines 10-11; paragraph 0032, lines 2-3; paragraph 0033, lines 2-3; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, elements 320 and 360);

if the first instruction is found in the first cache, incrementing a first associated counter (paragraph 0031, lines 11-13);

comparing a value of the first associated counter to a threshold (paragraph 0034, lines 9-11);

if the first associated counter exceeds the threshold, moving the first instruction from the first cache to a second cache (paragraph 0034, lines 15-16).

11. **As per claim 7**, Mendelson discloses the step of:

accessing the first instruction from the second cache (paragraph 0035, lines 15-17).

**Claim Rejections - 35 USC § 103**

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claims 2 and 8** are rejected under 35 U.S.C. 103(a) as being obvious over Mendelson in view of Wickeraad et al. (U.S. Patent Application Publication 2001/0001873).

14. **As per claim 2**, Mendelson discloses all the limitations of claim 2, except each instruction of the second plurality has an associated counter, and wherein when an instruction of the second plurality is accessed, all other counters of the second plurality are decremented.

Wickeraad discloses each instruction of the second plurality has an associated counter, and wherein when an instruction of the second plurality is accessed, all other counters of the second plurality are decremented (paragraph 0013, lines 2-4 and 8-12).

*It should be noted that "memory operand" is analogous to "instruction." It should also*

*be noted that if the "memory operand" is loaded into the cache line it is inherently required the "memory operand" was first accessed from main memory.*

Mendelson and Wickeraad are analogous art because they are from the same field of endeavor, that being cache replacement techniques.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Wickeraad's cache with an associated LRU counter for each cache line within Mendelson's trace cache subsystem.

The motivation for doing so would have been because the algorithm observes both cache hits and cache missed to create correspondence between the cache line selected for replacement and the probability that the cache line will be needed soon, thus, the LRU algorithm tends to be very effective (Wickeraad, paragraph 0012, lines 4-8).

Therefore, it would have been obvious to combine Mendelson and Wickeraad for the benefit of obtaining the invention as specified in claim 2.

15. **As per claim 6**, the combination of Mendelson/Wickeraad discloses each instruction of the second cache has an associated counter, and wherein when an instruction of the second cache is accessed, all other counters of the second cache are decremented (Wickeraad, paragraph 0013, lines 2-4 and 8-12).

16. **Claims 5 and 10** are rejected under 35 U.S.C. 103(a) as being obvious over Mendelson in view of Norman P. Jouppi, Improving Direct-Mapped Cache Performance by the Addition of a Small Fully-Associative Cache and Prefetch Buffers, hereafter "Jouppi."

17. **As per claim 5**, Mendelson discloses the first cache is an instruction cache (paragraph 0003, lines 9-12; paragraph 0028, lines 4-6; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, element 320).

Mendelson does not expressly disclose the second cache is fully associative and follows a least recently used policy.

Jouppi discloses the second cache is fully associative and follows a least recently used policy (pg. 367, section 3.1, lines 4-8).

Mendelson and Jouppi are analogous art because they are from the same field of endeavor, that being cache replacement techniques.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Jouppi's fully associative miss cache which follows a LRU replacement policy within Mendelson's trace cache subsystem.

The motivation for doing so would have been to have a cache that is fully-associative and has LRU replacement, thus eliminating the occurrences of conflict misses (Jouppi, pg. 366, section 3, lines 3-5).

Therefore, it would have been obvious to combine Mendelson and Jouppi for the benefit of obtaining the invention as specified in claim 5.

18. **As per claim 10**, the combination of Mendelson/Jouppi discloses the first cache is an instruction cache (Mendelson, paragraph 0003, lines 9-12; paragraph 0028, lines 4-6; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, element 320).

Mendelson does not expressly disclose the second cache is fully associative and follows a least recently used policy.



Jouppi discloses the second cache is fully associative and follows a least recently used policy (pg. 367, section 3.1, lines 4-8).

**19. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being obvious over Mendelson in view of Andrew S. Tanenbaum, "Structured Computer Organization, 2<sup>nd</sup> Edition", hereafter "Tanenbaum."**

**20. As per claim 11**, Mendelson discloses checking for a first line of data in a first cache, wherein each line of data in the first cache has an associated counter (paragraph 0031, lines 10-11; paragraph 0032, lines 2-3; paragraph 0033, lines 2-3; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, elements 320 and 360);

if the first line of data is found in the first cache, incrementing a first associated counter (paragraph 0031, lines 11-13);

comparing a value of the first associated counter to a threshold (paragraph 0034, lines 9-11);

if the first associated counter exceeds the threshold, moving the first line of data from the first cache to a second cache (paragraph 0034, lines 15-16).

Mendelson does not expressly disclose a computer program product in a computer readable medium, comprising:

first instructions for checking for a first line of data in a first cache, wherein each line of data in the first cache has an associated counter;

second instructions for, if the first line of data is found in the first cache, incrementing a first associated counter;

third instructions for comparing a value of the first associated counter to a threshold;

fourth instructions for, if the first associated counter exceeds the threshold, moving the first line of data from the first cache to a second cache.

Tanenbaum discloses that hardware and software are logically equivalent (pg. 11, line 11).

Mendelson and Tanenbaum are analogous art because they are from the same field of endeavor, that being computer hardware.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to follow Tanenbaum's argument and implement Mendelson's trace cache subsystem using instructions on a computer program product in a computer-readable medium having (i.e. implement hardware using software).

The motivation for doing so would have been to optimize such factors as cost, speed, and reliability (Tanenbaum, pg. 11, lines 14-15).

Therefore, it would have been obvious to combine Mendelson and Tanenbaum for the benefit of obtaining the invention as specified in claim 11.

21. **As per claim 12**, Mendelson discloses accessing the first instructions from the second cache (paragraph 0035, lines 15-16).

Mendelson does not disclose expressly a computer program, further comprising the step of:

accessing the first instruction from the second cache.

Tanenbaum discloses that hardware and software are logically equivalent (pg. 11, line 11).

**22. Claim 13 is rejected under 35 U.S.C. 103(a) as being obvious over Mendelson in view of Tanenbaum as applied to claim 11 above, and further in view of Wickeraad.**

Mendelson/Tanenbaum discloses all the limitations of claim 13 except each instruction of the second cache has an associated counter, and wherein when an instruction of the second cache is accessed, all other counters of the second cache are decremented.

Wickeraad discloses each instruction of the second cache has an associated counter, and wherein when an instruction of the second cache is accessed, all other counters of the second cache are decremented (paragraph 0013, lines 2-4 and 8-12).

Mendelson/Tanenbaum and Wickeraad are analogous art because they are from the same field of endeavor, that being cache replacement techniques.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Wickeraad's cache with an associated LRU counter for each cache line as software within Mendelson/Tanenbaum's software trace cache subsystem.

The motivation for doing so would have been because the algorithm observes both cache hits and cache missed to create correspondence between the cache line selected for replacement and the probability that the cache line will be needed soon,

thus, the LRU algorithm tends to be very effective (Wickeraad, paragraph 0012, lines 4-8).

Therefore, it would have been obvious to combine Mendelson/Tanenbaum and Wickeraad for the benefit of obtaining the invention as specified in claim 13.

**23. Claim 15 is rejected under 35 U.S.C. 103(a) as being obvious over Mendelson in view of Tanenbaum as applied to claim 11 above, and further in view of Jouppi.**

24. Mendelson/Tanenbaum discloses the first cache is an instruction cache (paragraph 0003, lines 9-12; paragraph 0028, lines 4-6; Fig. 1C, elements 101<sub>1</sub> - 101<sub>N</sub>; Fig. 3, element 320).

Mendelson/Tanenbaum does not expressly disclose the second cache is fully associative and follows a least recently used policy.

Jouppi discloses the second cache is fully associative and follows a least recently used policy (pg. 367, section 3.1, lines 4-8).

Mendelson/Tanenbaum and Jouppi are analogous art because they are from the same field of endeavor, that being cache replacement techniques.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Jouppi's fully associative miss cache which follows a LRU replacement policy as software within Mendelson/Tanenbaum's software trace cache subsystem.

The motivation for doing so would have been to have a cache that is fully-associative and has LRU replacement, thus eliminating the occurrences of conflict misses (Jouppi, pg. 366, section 3, lines 3-5).

Therefore, it would have been obvious to combine Mendelson/Tanenbaum and Jouppi for the benefit of obtaining the invention as specified in claim 15.

### **Response to Arguments**

25. Applicant's arguments with respect to **claims 1-3, 5-8, 10-13, and 15** have been fully considered but they are not persuasive.

### **1<sup>st</sup> POINT OF ARGUMENT**

26. Applicant argues in the fourth full paragraph of page 10 of the communication filed March 27, 2006 that "Mendelson does not teach a trace being copied when its value reaches a threshold. In Mendelson, a trace can remain in the FTC with its value well above the threshold. Therefore, Mendelson does not teach when the first associated counter reaches a threshold, the first instruction of the first plurality is copied into the second cache."

The Examiner respectfully disagrees. Applicant argues that Mendelson fails to show certain features of applicant's invention, it is noted that the features upon which Applicant relies are not recited in the rejected claim. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. As simply and broadly claimed, the last limitation of claim 1 recites "wherein when the

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first associated counter reaches a threshold, the first instruction of the first plurality is copied into the second cache.” Insofar as it appears to be clear, it is inherent that a comparison is made between the first associated counter and the threshold. In the case when the first associated counter reaches (i.e. is equal to) a threshold, the first instruction of the first plurality is copied into the second cache. However, the claim language when taken in its broadest most reasonable interpretation does not clearly recite at what point in time this comparison is made. Mendelson specifies the time at which the comparison is made. Mendelson paragraph 0034, lines 12-15 recites “**When** a trace is needed to be evicted from the FTC 320, the comparator 380 compares the stored threshold number J to the number of accesses extracted the usage counters  $360_N - 360_N$ .” Mendelson paragraph 0034, lines 15-16 further recites “If the number of access is **equal to** or higher than the threshold number “J”, the trace is moved to the MTC.” Therefore, Mendelson specifies the time at which the comparison is made to be **when** a trace is needed to be evicted from the FTC. In the case that the number of accesses (i.e. the usage counter value) is **equal to** (“reaches”) or greater than the threshold the trace is moved to the MTC (“second cache”). Accordingly, Mendelson discloses when the first associated counter reaches a threshold, the first instruction of the first plurality is copied into the second cache.

**2<sup>nd</sup> POINT OF ARGUMENT**

27. Applicant argues in the fifth full paragraph of page 10 of the communication filed March 27, 2006 that "Applicants' claim 3 depends from claim 1. Because Mendelson does not anticipate claim 1, Mendelson does not anticipate claim 3."

The Examiner respectfully disagrees and refers Applicant directly above to the comments made with respect to the 1<sup>st</sup> point of argument which state that Mendelson does in fact anticipate claim 1.

**3<sup>rd</sup> POINT OF ARGUMENT**

28. Applicant argues in the first full paragraph of page 11 of the communication filed March 27, 2006 that "Mendelson does not teach a trace being copied when its value reaches a threshold. In Mendelson, a trace can remain in the FTC even after its value far exceeds the threshold. Therefore, Mendelson does not teach if the first associated counter exceeds the threshold, moving the first instruction from the first cache to a second cache."

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1<sup>st</sup> point of argument.

**4<sup>th</sup> POINT OF ARGUMENT**

29. Applicant argues in the first full paragraph of page 11 that "Applicants' claim 7 depends on claim 7. Because Mendelson does not anticipate claim 6, Mendelson does not anticipate claim 7."

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1<sup>st</sup> and 2<sup>nd</sup> points of argument which state that Mendelson does in fact anticipate claim 6.

**5<sup>th</sup> POINT OF ARGUMENT**

30. Applicant argues in the fifth full paragraph of page 11 of the communication filed March 27, 2006 that "The examiner relies on Wickeraad to cure the deficiencies of Mendelson. Wickeraad, however, does not cure the deficiencies of Mendelson. The combination does not render these claims unpatentable because the combination does not describe, teach, or suggest the combination of wherein when the first associated counter reaches a threshold, the first instruction of the first plurality is copied into the second cache, wherein each instruction of the second plurality has an associated counter, and wherein when an instruction of the second plurality is accessed, all other counters of the second plurality are decremented."

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1<sup>st</sup> point of argument which state that Mendelson does not contain any deficiencies. The Examiner also refers the Applicant above to the 103 rejections of claims 2 and 8.

**6<sup>th</sup> POINT OF ARGUMENT**

31. Applicant argues in the seventh full paragraph of page 11 of the communication filed March 27, 2006 that "The examiner relies on Jouppi to cure the deficiencies of



Mendelson. Jouppi, however, does not cure the deficiencies of Mendelson. The combination does not render these claims unpatentable because the combination does not describe, teach, or suggest the combination of wherein when the first associated counter reaches a threshold, the first instruction of the first plurality is copied into the second cache and the first cache being an instruction cache and the second cache being fully associative and following a least recently used policy."

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1st point of argument which state that Mendelson does not contain any deficiencies. The Examiner also refers the Applicant above to the 103 rejections of claims 5 and 10.

#### **7<sup>th</sup> POINT OF ARGUMENT**

32. Applicant argues in the third full paragraph of page 12 of the communication filed March 27, 2006 that "The examiner relies on Tannenbaum to cure the deficiencies of Mendelson. Tannenbaum, however, does not cure the deficiencies of Mendelson. The combination does not render these claims unpatentable because the combination does not describe, teach, or suggest fourth instructions for, if the first associated counter exceeds the threshold, moving the first line of data from the first cache to a second cache."

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1st point of argument which state that Mendelson

does not contain any deficiencies. The Examiner also refers the Applicant above to the 103 rejection of claim 11.

#### **8<sup>th</sup> POINT OF ARGUMENT**

33. Applicant argues in the fourth full paragraph of page 12 of the communication filed March 27, 2006 that "Claim 12 depends from claim 11 and is believed patentable for these reasons given above."

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1st point of argument which state that Mendelson does not contain any deficiencies. The Examiner also refers the Applicant above to the 103 rejection of claim 12.

#### **9<sup>th</sup> POINT OF ARGUMENT**

34. Applicant argues in the sixth full paragraph of page 12 of the communication filed March 27, 2006 that "The examiner relies on the combination of Tannenbaum and Wickeraad to cure the deficiencies of Mendelson. The combination of Tannenbaum and Wickeraad, however, does not cure the deficiencies of Mendelson. The combination does not render these claims unpatentable because the combination does not describe, teach, or suggest the combination of fourth instructions for, if the first associated counter exceeds the threshold, moving the first line of data from the first cache to a second cache and wherein each line of data of the second cache has an associated

counter, and wherein when a line of data of the second cache is accessed, all other counters of the second cache are decremented.”

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1st point of argument which state that Mendelson does not contain any deficiencies. The Examiner also refers the Applicant above to the 103 rejection of claim 13.

#### **10<sup>th</sup> POINT OF ARGUMENT**

35. Applicant argues in the sixth full paragraph of page 12 of the communication filed March 27, 2006 that “The examiner relies on the combination of Tannenbaum and Jouppi to cure the deficiencies of Mendelson. The combination of Tannenbaum and Jouppi, however, does not cure the deficiencies of Mendelson. The combination does not render these claims unpatentable because the combination does not describe, teach, or suggest the combination of fourth instructions for, if the first associated counter exceeds the threshold, moving the first line of data from the first cache to a second cache and wherein the first cache is an instruction cache and the second cache is fully associative and follows a least recently used policy.”

The Examiner respectfully disagrees and refers Applicant above to the comments made with respect to the 1st point of argument which state that Mendelson does not contain any deficiencies. The Examiner also refers the Applicant above to the 103 rejection of claim 15.

**Conclusion**

**STATUS OF CLAIMS IN THE APPLICATION**

The following is a summary of the treatment and status of all claims in the application as recommended by MPEP 707.70(i):

**CLAIMS REJECTED IN THE APPLICATION**

Per the instant office action, claims 1-3, 5-8, 10-13, and 15 have received a second action on the merits and are subject of a second action final.

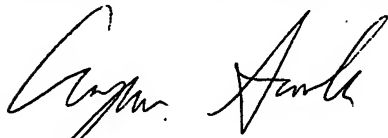
**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

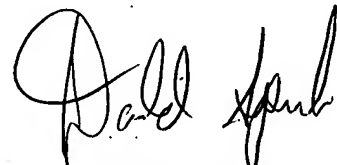
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arpan P. Savla whose telephone number is (571) 272-1077. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Arpan Savla  
Assistant Examiner  
Art Unit 2185  
June 9, 2006



DONALD SPARKS  
SUPERVISORY PATENT EXAMINER